

**University of Groningen
Faculty of Science and Engineering
Industrial Engineering and Management**

**Exam Management Accounting
WBIE022-05**

Date: 31-03-2021

Instructions:

Keep the virtual exam room open during the exam. Here, additional announcements will be made.

This exam is an open book exam to be completed at home in 3 hours. This means that you are allowed to use the course textbook to assist you to provide the solutions of the exam. You can also use a calculator and a dictionary.

However, there are several restrictions that you need to adhere to. You need to complete this exam individually, without consulting others. You cannot consult any other sources, including the internet. You will need to complete the student pledge. Make sure you do so before commencing the exam. An exam without pledge will not be marked, and results in a failure to complete the course. Your answers will be checked by the plagiarism scanner to check for similarities in (wrong) answers. We will arrange an oral examination if we are unsure of your ability to achieve the course objectives. This oral examination will be taken through Google Meet. Should we find cheating or other forms of dishonest behaviour, this suspicion will be reported to the Board of Examiners.

The exam is in pdf. You need to complete your answers on a Word 2010/2011/2016/2019 (.doc/.docx) file on Windows or on Apple Macintosh. Make sure you clearly indicate the question number and subnumber in **bold**. So for example:

- 4. This is the first sentence of my answer.
- 8. This is the first sentence of my answer. Etc.

On the first page of your answer document, include your name, student number and university email address. ***You need to use the answering template, available on the Nestor course website.***

On some questions, if needed to, you can insert a picture of your calculations if you feel that Word does not offer you a way to express your answer. Use this sparingly and be aware that you are responsible for the clarity and legibility of the document, including any pictures included.

Please check that the file you submit is readable by the software. Submission of files that cannot be opened by Word for Mac or Word for Windows will not be marked and results in a failing grade for the exam. No exceptions to this rule will be made, so check your file carefully before submission.

Good luck!

TRUE/FALSE. Write 'True' if the statement is true and 'False' if the statement is false. Provide for each answer a very short explanation in 1 or 2 sentences. Write your answer in the template provided.

1. Techpro has a selling price of \$10 and variable costs of \$6. If both the selling price and the variable costs increase by 10%, the break-even point will not change. (2 pt.)

2. A manager believes that the number of units sold drives the company's selling costs. The number of units sold would be referred to as the cost driver. (2 pt.)

3. If the master budget prepared at a volume level of 10,000 units includes direct labor of \$10,000, a flexible budget based on a volume of 11,000 units would include direct labor of \$10,000. (2 pt.)

4. If a company is operating beyond its break-even point, sale of one more unit of product increases the company's profit by the amount of the unit contribution margin. (2 pt.)

5. Because volume-based allocation rates assign more cost to high-volume products, low-volume products are often undercosted. (2 pt.)

6. The market value of equipment owned by a company is a sunk cost and should not be taken into account in deciding whether or not to replace the equipment. (2 pt.)

ESSAY QUESTIONS. Write your answer in the template provided.

7. What does the margin of safety measure? (4 pt.)

8. The Parsons Company makes and sells two models of blenders, as follows:

	Smoothie Pro	Blend master
Sales price per unit	\$ 50	\$ 80
Variable cost per unit	25	45
Contribution margin per unit	\$ 25	\$ 35

The Parsons Company expects to incur annual fixed costs of \$151,250. The relative sales mix of the products is 3 units of Smoothie Pro for every one unit of Blend master.

Required

1) Determine the total number of blenders (Smoothie Pro and Blend master combined) that Parsons must sell to break even. (2 pt.)

2) What is the number of units of Smoothie Pro and of Blend master that Parsons would expect to sell at the break-even point? (2 pt.)

9. The management accountant at Morrison, Inc. provided the following estimated costs for producing 2,500 units of a specialty product manufactured by the firm

Direct Materials	\$ 10,000
Direct Labor (1 hour per unit)	5,000
Unit-level support costs	10,000
Batch level support costs	5,000
Product-level support costs	3,000
Facility-level support costs	7,000

The company believes that direct labor hours are the most appropriate cost driver for assigning overhead costs to its product.

Required

1) Compute the predetermined overhead rate for this company. (2 pt.)

2) Compute the specialty product's total estimated cost per unit. (2 pt.)

3) Why do firms assign overhead costs using a predetermined overhead rate instead of assigning actual costs? (2 pt.)

10. Jefferson Company expects to incur \$450,000 in manufacturing overhead costs during the current year. Other budget information follows

	Department A	Department B	Department C
Direct labor hours	15,000	5,000	20,000
Machine hours	8,000	10,000	12,000

Required

- 1) Use direct labor hours as the cost driver to compute the allocation rate. Determine the amount of budgeted overhead cost for each department. (2 pt.)
- 2) Use machine hours as the cost driver to compute the allocation. Determine the amount of budgeted overhead cost for each department. (2 pt.)
- 3) Assume that Department A manufactured a product that required 160 direct labor hours and 85 machine hours. If overhead is allocated based on direct labor hours, how much overhead would be allocated to this product? (2 pt.)
- 4) Assume that Department A manufactured a product that required 160 direct labor hours and 85 machine hours. If overhead is allocated based on machine hours, how much overhead would be allocated to this product? (2 pt.)

11. The Mendez Company is trying to decide whether to replace a packing machine that it uses to pack salsa into individual serving size packages. The following information is provided:

Current machine	
Original cost	\$ 26,000
Accumulated depreciation	16,000
Annual operating costs	4,000
Current salvage value	4,000
Salvage value at the end of five years	1,000

New machine	
Cost	\$ 16,000
Annual operating costs	1,000
Salvage value at the end of five years	1,000

Required

- 1) Compute the increase or decrease in total net income over the five-year period if the company chooses to buy the new machine. (2 pt.)
- 2) Compute the impact on the company's net income in the first year if the current machine is replaced. Do not take depreciation into account. (2 pt.)
- 3) Under what circumstances might a manager not take the action that is in the best interest of the firm in the long run? (2 pt.)

12. Bates Golf Supply produces a golf bag that sells for \$220. Although the company's production capacity is 5,000 bags per year, only 4,000 bags are currently being produced and sold. The production costs for 4,000 bags are as follows:

Unit-level material cost	\$ 300,000
Unit-level labor cost	240,000
Unit-level overhead	75,000
Batch-level setup costs (500 units per batch)	16,000
Product-level costs	20,000
Allocated facility-level costs	25,000

Golf Mart Stores has offered to purchase 1,000 golf bags as a one-time special purchase at a price of \$170 per bag.

Required

Prepare a quantitative analysis that indicates whether the special order should be accepted. (4 pt.)

13. Dandridge Company established a direct materials standard of 4 pounds at \$4.50 per pound for one of its products. During April, Dandridge produced 22,000 units of the product, using 86,000 pounds of material.

Required

Based on this information,

- (a) Which variance can you calculate? (2 pt.)
- (b) What is the dollar amount of the variance? (2 pt.)
- (c) Is the variance favorable or unfavorable? (2 pt.)

14. Harrison Company expects to incur \$600,000 in manufacturing overhead for the coming year. The company makes two products, A and B, and it has accumulated the following budget information for the products

	Product A	Product B	Total
Number of units to be produced	10,000	5,000	15,000
Direct labor hours	25,000	5,000	30,000
Machine hours	15,000	30,000	45,000

Required

- 1) Use direct labor hours as the cost driver to compute the allocation rate. Determine the amount of budgeted overhead to be allocated to each unit of product A. **(Round to the nearest cent.)** (2 pt.)
- 2) Use machine hours as the cost driver to compute the allocation rate. Determine the amount of budgeted overhead to be allocated to each unit of product A. **(Round to the nearest cent.)** (2 pt.)
- 3) How should Harrison decide between machine hours and direct labor hours as the cost driver for its manufacturing overhead? (2 pt.)

15. Sweetheart Brands packages single-sized servings of sugar and sugar substitute for fast food restaurants. The activities required to package sugar are fewer and less complex than for sugar substitute. The direct costs of producing the two products are as follows

	Sugar	Sugar Substitute
Direct materials	\$ 0.02	\$ 0.04
Direct labor	0.04	0.08

Overhead is currently assigned to the two products on the basis of machine hours. The following information is provided regarding overhead costs

Activity	Traceable Costs	Cost Driver	Sugar Line	Sugar Subst. Line	Total
Setup	\$ 50,000	No. of setups	125	125	250
Packing	120,000	No. of machine hrs.	10,000	40,000	50,000
Inspection	30,000	No. of batches	250	350	600
	\$ 200,000				

Required

- 1) Compute the predetermined overhead rate under the current method of overhead cost allocation. How much total overhead cost will be assigned to each product under the current system? (2 pt.)
- 2) Compute the three activity rates that would be used in an activity-based system. How much total overhead cost will be assigned to each product under an ABC system? (2 pt.)
- 3) Assuming an ABC system to be more precise, by how much does the company's current costing system over- or undercost the products? Be specific. (2 pt.)

16. Chavez Company is considering purchasing new equipment or overhauling its existing equipment. The manager has gathered the following information

Current machinery	
Original cost	\$ 50,000
Accumulated depreciation	40,000
Annual operating costs	5,000
Current market value	1,500
Salvage value at the end of five years	-
Cost of overhauling machinery	
Cost of overhaul	\$ 12,000
Annual operating costs after overhauling	2,000
Salvage value at the end of five years	-
New machinery	
Cost	\$ 56,000
Annual operating costs	1,000
Salvage value at the end of five years	-

Required

- 1) Identify the sunk costs associated with this decision. (2 pt.)
- 2) Compute the increase or decrease in total income over the five-year period if the company chooses to buy the new equipment. (2 pt.)
- 3) Compute the increase or decrease in total income over the five-year period if the company chooses to overhaul its existing machinery. (2 pt.)
- 4) What is your recommendation for this decision? (2 pt.)

17. Explain whether the use of book value as the valuation base for calculating return on investment can distort ROI and cause motivational problems among managers. (4 pt.)

18. The following information is for a product of Lanier Company

Last year, the variable cost per unit was \$25. Total fixed costs were \$800,000. At a volume of 170,000 units, the company achieved a profit of \$50,000.

Required

What was the unit sales price for the product last year? (4 pt.)

19. For Year 1, Division C of Deerfield Company reported operating assets of \$8,800,000, revenues of \$6,600,000, and operating expenses of \$5,760,000. The company has established a target return on investment (ROI) of 10% for the division.

Required

1) Calculate the Year 1 ROI for the division. Did the division achieve its target ROI for the year? (2 pt.)

2) For Year 2, Division C managers expect that its operating assets will stay at about the same level as for Year 1. Variable expenses for Year 1 were \$3,960,000, and the remaining expenses were fixed. The managers expect that the contribution margin ratio for Year 2 will be the same as for Year 1 and that the amount of fixed expenses will not change. To what level must sales increase in Year 2 to achieve the target ROI? (2 pt.)

20. The Water Management Company has two operating divisions, the Service Division and the Irrigation Division. The company evaluates the performance of its divisions using the return on investment (ROI) measure. The following information pertains to the two divisions as of the end of the current year.

	Service Division	Irrigation Division	Total
Units repaired; Units produced and sold	8,000	250	
Level of investment in operating assets	\$ 400,000	\$ 1,000,000	\$ 1,400,000
Expenses			
Direct materials	40,000	400,000	440,000
Direct labor	200,000	200,000	400,000
Overhead	25,000	250,000	275,000
Selling/administrative (S&A) costs	15,000	150,000	165,000
Total expenses	\$ 280,000	\$ 1,000,000	\$ 1,280,000

The average service fee was \$50.00 per unit for the Service Division, while the average selling price of an irrigation system was \$5,000 for the Irrigation Division. The company requires a minimum return on investment of 12%.

Required

Compute the return on investment (ROI) measure for both divisions and the company as a whole. Based on ROI alone which division had the better performance? (Round ROI measures to the nearest whole percent.) (4 pt.)

21. Perfect Products provided the following selected information about its consumer products division for the current year:

Desired ROI	14 %
Net income	\$ 220,000
Residual income	\$ 15,000

Required

Based on this information, calculate the company's investment amount. Round your answer to the nearest dollar. (4 pt.)

Answer key

1. FALSE

Explanation Contribution margin before changes = \$10 per unit – \$6 per unit = \$4 per unit
Contribution margin after changes = (\$10 per unit × 1.10) – (\$6 per unit × 1.10) = \$4.40 per unit
Recall that the break-even point equals fixed costs divided by the contribution margin per unit. If the contribution margin per unit increases, the break-even point decreases.

2. TRUE

Explanation

3. FALSE

Explanation Standard cost per unit = Standard cost ÷ Expected volume
Standard direct material cost per unit = \$10,000 ÷ 10,000 units = \$1.00 per unit
Flexible budget = Standard cost per unit × Actual volume
Flexible budget at a level of 11,000 units = \$1.00 per unit × 11,000 units = \$11,000

4. TRUE

Explanation Recall that each additional unit sold will increase profit by the contribution margin per unit. Once the fixed costs are covered at the break-even point, the sales of each additional unit will increase profit by an amount equal to the contribution margin per unit.

5. TRUE

Explanation

6. FALSE

Explanation

7. Answers will vary

The margin of safety measures the amount of cushion between budgeted sales and the break-even point.

8. 1)

Weighted average contribution margin = $\{(3 \times \$25) + (1 \times \$35)\} \div 4 = \$27.50$

Total number of units to sell to break-even = $\$151,250 \div \$27.50 = 5,500$

2)

Number of units of Smoothie Pro = $3/4 \times 5,500 = 4,125$ units

Number of units of Blend master = $1/4 \times 5,500 = 1,375$ units

9. 1) Predetermined overhead rate Total overhead = $\$10,000 + \$5,000 + \$3,000 + \$7,000 = \$25,000$;

Predetermined rate = $\$25,000 \div 2,500 = \10.00 per direct labor hour

2) Cost per unit

Direct materials (\$10,000/2,500)	\$	4.00	
Direct labor (\$5,000/2,500)		2.00	
Overhead (1 hour × \$10)		10.00	
Total cost per unit	\$	16.00	
-			

3) Using a predetermined rate allows management to determine the cost of the product in a more timely manner. In addition, it smoothes out or annualizes overhead costs so that unit costs are more stable.

10. 1) Allocation rate = $\$450,000 \div 40,000$ direct labor hours = \$11.25 per direct labor hour

Amount of overhead allocated to Department A = $15,000 \times \$11.25 = \$168,750$

Amount of overhead allocated to Department B = $5,000 \times \$11.25 = \$56,250$

Amount of overhead allocated to Department C = $20,000 \times \$11.25 = \$225,000$

2) Allocation rate = $\$450,000 \div 30,000$ machine hours = \$15 per machine hour

Amount of overhead allocated to Department A = $8,000 \times \$15 = \$120,000$

Amount of overhead allocated to Department B = $10,000 \times \$15 = \$150,000$

Amount of overhead allocated to Department C = $12,000 \times \$15 = \$180,000$

3) $160 \text{ direct labor hours} \times \$11.25 = \$1,800$

4) $85 \text{ machine hours} \times \$15 = \$1,275$

11. 1)

Increase or decrease in income

Cost savings ($\$4,000 - \$1,000$) $\times 5$	\$ 15,000		
Current salvage value	4,000		
Cost of new	(16,000)		
Increase in income	\$ 3,000		
-			

2)

First-year impact

Cost savings ($4,000 - \$1,000$) $\times 1$	\$ 3,000		
Loss on exchange ($\$10,000 \text{ BV} - \$4,000 \text{ SV}$)	(6,000)		
Net decrease in income	\$ (3,000)		
-			

3)

The manager might not take the action that is in the best interest of the firm in the long run when the manager is under intense pressure to show profitability in the short run.

12. 1)

Evaluation of special order

Revenue ($1,000 \times \$170$)	\$ 170,000		
Less special order costs			
Unit-level costs ($(\$300,000 + 240,000 + 75,000) \times 1,000/4,000$)	153,750		
Batch-level costs ($\$16,000/8 \text{ batches} \times 2$)	4,000		
Increase in profit if special order accepted	\$ 12,250		
Therefore, the special order should be accepted.			
-			

13. (a) Materials usage variance

(b) $(86,000 - 88,000) \times \$4.50 = \$9,000$

(c) Favorable

14. 1) Allocation rate = $\$600,000 \div 30,000$ direct labor hours = \$20.00 per hour
Amount of overhead per unit of product A = $(25,000 \times \$20) \div 10,000$ units = \$50.00

2) Allocation rate = $\$600,000 \div 45,000$ machine hours = \$13.33 per hour
Amount of overhead per unit of product A = $(15,000 \times \$13.33) \div 10,000$ units = \$20.00

3) Harrison should consider which of the two possible cost drivers, labor hours or machine hours, is more likely to have a cause-and-effect relationship with overhead costs.

15. 1)

Allocation rate based on machine hours

Total overhead/Total machine hours = $\$200,000/50,000$ = \$4.00 per machine hour

Total overhead assigned

Sugar $\$4.00 \times 10,000$ = \$40,000

Sugar Substitute $\$4.00 \times 40,000$ = \$160,000

2)

Allocation rate based on ABC

Setup $\$50,000/250$ = \$200 per setup

Packing $\$120,000/50,000$ = \$2.40 per machine hour

Inspection $\$30,000/600$ = \$50 per inspection

Total overhead assigned

	Sugar	Sugar Substitute				
Setup ($\$200 \times 125$; 125)	\$ 25,000	\$ 25,000				
Packing ($\$2.40 \times 10,000$; 40,000)	24,000	96,000				
Inspection ($\$50 \times 250$; 350)	12,500	17,500				
Total	\$ 61,500	\$ 138,500				
-						

3)

The current system undercosts sugar by \$21,500 ($\$61,500 - \$40,000$) and overcosts sugar substitute by the same amount.

16. 1)

Sunk costs include the original cost and accumulated depreciation (i.e., book value) of the existing machinery.

2)

Increase or decrease in income if new machine is purchased

Cost savings ($\$5,000 - \$1,000$) $\times 5$	\$ 20,000			
Current market value	1,500			
Cost of new equipment	(56,000)			
Decrease in income	\$ (34,500)			
-				

3)

Increase or decrease in income if machine is overhauled

Cost savings (\$5,000 – \$2,000) × 5	\$ 15,000			
Cost of overhaul	(12,000)			
Increase in income	\$ 3,000			
-				

4)

The existing machine should be overhauled.

17. Using book value as the valuation base for calculating return on investment can distort ROI and cause motivational problems among managers. Due to lower book values, ROI increases even without managerial action.

18. Unit contribution margin = $\$850,000 \div 170,000 = \5

Sales price = $\$25 + \$5 = \$30$

19. 1) $\text{ROI} = \$840,000 \text{ operating income} \div \$8,800,000 = 9.5\%$. The division fell short of the target ROI.

2) Year 1 contribution margin ratio $(\$6,600,000 - \$3,960,000) \div \$6,600,000 = 40\%$; variable expenses are 60% of sales.

Target operating income = $\$8,800,000 \times 10\% = \$880,000$

Total fixed costs = $\$5,760,000 - \$3,960,000 = \$1,800,000$

Target sales = $(60\% \times \text{target sales}) + \$880,000 + \$1,800,000$

Target sales to achieve desired level of ROI = $\$6,700,000$

20. ROI measures

	Service Division	Irrigation Division	Total						
Revenue	\$ 400,000	\$ 1,250,000	\$ 1,650,000						
Less expenses	280,000	1,000,000	1,280,000						
Income	\$ 120,000	\$ 250,000	\$ 370,000						
Divided by investment	400,000	1,000,000	1,400,000						
Return on investment (ROI)	\$ 30 %	\$ 25 %	\$ 26 %						
-									

Based on ROI alone, the Service Division had better performance.

21. Investment = $(\text{Net Income} - \text{Residual Income}) \div \text{Desired ROI} = \$205,000 \div 14\% = \$1,464,286$